

BEST AVAILABLE COPY**RECEIVED
CENTRAL FAX CENTER****MAR 08 2007**

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

Remarks / Arguments

Applicants thank the Examiner for the thoroughness of examination detailed in the Office Action of November 11, 2006 and respectfully request favorable reconsideration of this application as amended.

Claim Rejections Under 35 U.S.C. § 112:

Claims 29-43, 45-48 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

With respect to the term "and/or", Applicants have amended this term to simply "or". As such, they believe that one of ordinary skill in the art would readily understand the metes and bounds of the claims.

With respect to the alternative expressions in claims 43 and 48, Applicants have amended claim 43 to place it in Markush form as suggested by the Examiner. Claim 48 has been canceled.

With respect to the lack of antecedent basis in claim 44, that claim has been canceled.

Claims 29-43, 45-48 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

In view of the greater clarity provided by the Examiner with regard to the disclosure of an iris in the reference U.S. Patent No. 6,789,400 (Lu et al.), Applicants now clarify their argument regarding the issue of enablement by Lu et al. of manipulation of an iris per se. Applicants have not previously, and do not now, argue that Lu et al. is not enabling of manipulation of an iris per se.

Applicants were under the mistaken belief that the Examiner had taken the position that Lu et al. teaches manipulation of a non-iris cap assembly 1. It is now

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

apparent to Applicants that the Examiner has taken the position that Lu et al. teaches manipulation of an iris.

Applicants agree that Lu et al. discloses the use of an iris but such disclosure is not associated with the cap assembly 1 that is part and parcel with the heat exchanger taught by Lee et al. In other words, the separate disclosures of the cap assembly 1 and the iris are mutually exclusive.

Applicants respectfully traverse the above rejection for the following reasons. The Examiner has rightly found that per se manipulation of an iris is enabled by the disclosure of Lu et al. Applicants assert that manipulation of an iris per se is well known in the art and need not be replicated in the Specification of the instant application above and beyond that which is already described therein.

The issue at hand is whether Lu et al. enables manipulation of the cap assembly, not whether Lu et al. enables manipulation of an iris. Applicants assert that this distinction is important because one of ordinary skill in the art, upon reading the Lu et al. disclosure as a whole, would likely conclude that Lu et al. teaches the use of a cap assembly 1 with the heat exchanger, but does not teach the use of an iris with the heat exchanger. Applicants arguments concerning the above-identified issue follow.

Applicants kindly direct the Examiner's attention to line 49 of column 8 through line 9 of column 9. Applicants respectfully assert that one of ordinary skill would likely consider this portion of Lu et al. at the end of the Detailed Description before the Examples to describe the various pros and cons of conventional heat exchangers versus the Lu et al. This is exemplified by language such as

In many commercial heat exchangers, the coolant is fed from the bottom through a single-chamber feed assembly. An iris plate is usually attached to the bottom of the feed assembly to restrict the egress of the coolant from the feed chamber. The diameter of the opening of the iris plate is quite small (usually between 1 and 5 mm), the gas velocity at the iris plate can reach 50 meters per second or higher, depending on the feed flow rate, cooling chamber tube diameter and length of the cooling chamber tube, as well as the iris

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

diameter. The high gas velocity through the iris plate could cause fiber vibration, which would result in fiber breakage and affect the fiber quality.

Another problem associated with the iris plate design is the percentage of the coolant lost from the bottom increases with the decrease of feed flow and can not be conveniently adjusted for varying flow rates.

Given this language, it would have been apparent to one of ordinary skill in the art that Lu et al. described the iris with respect to conventional heat exchangers not the Lu et al. heat exchanger. If this portion of the Lu et al. disclosure is considered along with the remaining disclosure of Lu et al., Applicants assert that one of ordinary skill would more likely than not consider Lu et al. to describe use of the iris with conventional heat exchangers and not use of the iris with the Lu et al. heat exchanger.

In view of the Examiner's failure to provide evidence underlying his consideration of factors A-H enumerated in the Final Office Action of November 8, 2006 in comparison to the evidence provided by Applicants above, Applicants believe they have overcome the rejection and kindly ask the Examiner to either withdraw the rejection or provide detailed evidence that is more persuasive than that described above.

Furthermore, Applicants respectfully assert that the Examiner's argument regarding Lu et al. is presumed to be enabled because it is a granted patent and that Applicants have failed to provide a proper analysis of factors A-H enumerated in the November 8, 2006 Final Office Action is flawed. To the extent that Lu et al. enables the manipulation of an iris, it merely recites the use of an iris without any description as to how it is manipulated (column 8, line 49 through column 9, line 9). If the Examiner concludes that this mere scintilla of evidence supports a finding that Lu et al. enables manipulation of an iris, then it necessarily follows that a disclosure equal in weight to, or greater in weight, would similarly enable manipulation of an iris. Thus, it necessarily follows that Applicants disclosure

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

(lines 5-11 of page 7 and line 32 of page 13 through line 4 of page 14) provides sufficient evidence supporting the legal conclusion that Applicants claims are enabled. Applicants kindly point out that the Examiner has the burden of persuasion in showing unpatentability of the claims. Thus, to conclude that Lu et al. enables manipulation of an iris while Applicants Specification would constitute an arbitrary and capricious act that would be overturned on appeal.

Claim Rejections Under 35 U.S.C. § 103:

Claims 29-35 and 37-43, 45-47 and 49 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Lu et al. Applicants respectfully traverse the rejection because Lu et al. teaches away from the hypothetical combination of various teachings in Lu et al. as suggested by the Examiner.

A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant. *See United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966) ("known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account in determining obviousness"); *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (CCPA 1963) (reference teaches away if it leaves the impression that the product would not have the property sought by the applicant).

Evidence supporting the legal conclusion that Lu et al. teaches away from the use of an iris in the heat exchanger disclosed therein follows. Applicants kindly direct the Examiner's attention to line 49 of column 8 through line 9 of column 9. Applicants respectfully assert that one of ordinary skill would likely consider this portion of Lu et al. at the end of the Detailed Description before the

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

Examples to describe the various pros and cons of conventional heat exchangers versus the Lu et al. This is exemplified by the below Lu et al. text. The portion of description directed to the use of an iris in conventional heat exchangers is in italics. Text that is especially relevant to a legal conclusion that Lu et al. teaches away from the claimed invention is in bold italics. Text that describes the heat exchanger that Lu et al. proposes to use to solve the problems of iris plates is underlined.

*In many commercial heat exchangers, the coolant is fed from the bottom through a single-chamber feed assembly. An iris plate is usually attached to the bottom of the feed assembly to restrict the egress of the coolant from the feed chamber. The diameter of the opening of the iris plate is quite small (usually between 1 and 5 mm), the gas velocity at the iris plate can reach 50 meters per second or higher, depending on the feed flow rate, cooling chamber tube diameter and length of the cooling chamber tube, as well as the iris diameter. **The high gas velocity through the iris plate could cause fiber vibration, which would result in fiber breakage and affect the fiber quality.***

Another problem associated with the iris plate design is the percentage of the coolant lost from the bottom increases with the decrease of feed flow and can not be conveniently adjusted for varying flow rates. By using a double- or multiple-chambered assembly on the bottom of a heat exchanger while feeding coolant to the upper chamber and sealing gas to the bottom chamber of a, for instance, double-chambered assembly the coolant gas loss through the fiber outlet can be greatly reduced and the sealing gas flow can be adjusted according to the feed flow. In addition, the size of the opening of the fiber outlet at the bottom chamber can be made larger than the opening of an iris plate that would be used without the expense of losing coolant from the bottom. By doing so, the linear velocity at the fiber outlet is reduced and thus the chances of fiber vibration caused by the high flow velocity is greatly reduced.

Given this text which first describes the problems of iris plates used in conventional heat exchangers and then describes how these problems are solved with the invention proposed by Lu et al., it would have been apparent to one of ordinary skill in the art that Lu et al. described use of the iris with respect to

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

conventional heat exchangers and not the Lu et al. heat exchanger. Thus, the Examiner's rejection is most properly viewed as a combination of the separate disclosures of: a) the various details of the Lu et al. inventive cap assembly 1, and b) use of an iris with conventional heat exchangers.

Applicants assert that one of ordinary skill in the art at the time of the invention would have been discouraged from following the path set out in the reference because Lu et. discloses that use of an iris plate could cause fiber vibration which would result in fiber breakage and affect the fiber quality. Also, when iris plates are used, the percentage of the coolant lost from the bottom increases with the decrease of feed flow and can not be conveniently adjusted for varying flow rates.

Applicants also assert that one of ordinary skill in the art would have been led in a direction divergent from the path that was taken by the applicant. As described by the Specification at line 29 of page 1 through line 4 of page 2, one problem relates to the escape and excessive loss of helium through the inlet and outlet ends of the heat exchanger into the surrounding atmosphere during cooling of the fiber. Keeping the loss of helium and/or other coolant gases from the heat exchanger to a minimum during operation is highly desirable to maximize cooling efficiencies within the chamber and minimize operating costs. Thus, Applicants sought to keep the loss of helium and/or other coolant gases from the heat exchanger during operation. In contrast, Lu et al. teaches that the percentage of the coolant lost from the bottom increases with the decrease of feed flow and can not be conveniently adjusted for varying flow rates when iris plates are used.

Applicants further assert that Lu et al. teaches away from the claimed invention because it leaves the impression that the product would not have the property sought by the applicant. As described by the Specification at line 29 of page 1 through line 4 of page 2, one problem relates to the escape and excessive loss of helium through the inlet and outlet ends of the heat exchanger into the surrounding atmosphere during cooling of the fiber. Keeping the loss of helium

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

and/or other coolant gases from the heat exchanger to a minimum during operation is highly desirable to maximize cooling efficiencies within the chamber and minimize operating costs. Thus, Applicants sought to keep the loss of helium and/or other coolant gases from the heat exchanger during operation. In contrast, Lu et al. teaches that the percentage of the coolant lost from the bottom increases with the decrease of feed flow and can not be conveniently adjusted for varying flow rates when iris plates are used.

Thus, for the reasons set forth above, the rejection of claims 29-35 and 37-43, 45-47 and 49 under 35 U.S.C. § 103(a) should be withdrawn.

Claim 36 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lu et al., as applied to claim 35 above, and further in view of U.S. Patent No. 4,792,347 (Deneka). Applicants traverse the rejection because Lu et al. teaches away from the hypothetical combination of teachings suggested by the Examiner as described above and the Examiner has not pointed to any motivation taught by Deneka to the contrary. Thus, the rejection of claim 36 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 42-44 and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Lu et al., as applied to claim 32 above, and further in view of U.S. Patent No. 5,942,020 (Marcelissen) and optionally in view of Deneka and/or Wikipedia.com's "control system" entry. Applicants traverse the rejection because Lu et al. teaches away from the hypothetical combination of teachings suggested by the Examiner as described above and the Examiner has not pointed to any motivation taught by Marcelissen, Deneka, or the Wikipedia.com's "control system" entry to the contrary. Additionally, Applicants assert that the "control system" entry of Wikipedia.com is not 35 USC 102 prior art because the Examiner has not shown that the Wikipedia.com entry predates the filing date of the instant application. 35 U.S.C. § 103(a) should be withdrawn. Thus, the rejection of claims 42-44 and 48 under 35 U.S.C. § 103(a) should be withdrawn.

RECEIVED
CENTRAL FAX CENTER

MAR 08 2007

Application No. 10/765,468
Amendment dated March 8, 2007
Reply to Office Action of November 08, 2006

Conclusion

For the reasons set forth above, Applicants request the Examiner to withdraw the rejections and allow the application.

Should the examiner believe a telephone call would expedite the prosecution of the application, he is invited to call the undersigned attorney at the number listed below. A Request for Continued Examination and Petition for Extension of Time are being contemporaneously filed with this submission along with the associated fees. Otherwise, it is believed that no other fee is due at this time. If that belief is incorrect, please debit deposit account number 01-1375. Also, the Commissioner is authorized to credit any overpayment to deposit account number 01-1375.

Respectfully submitted,



Christopher J. Cronin, Reg. No. 46,513

Date: March 8, 2007

Air Liquide
2700 Post oak Blvd., Suite 1800
Houston, Texas 77056
Phone: (302) 286-5525
Fax: (302) 286-5583

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.